

## Stem Cell-Based Therapy for Cartilage Regeneration and Osteoarthritis

### Grant Award Details

Stem Cell-Based Therapy for Cartilage Regeneration and Osteoarthritis

**Grant Type:** Early Translational I

**Grant Number:** TR1-01216

**Project Objective:** The overall objective of this early translation grant is to develop stem cell-based therapy for the treatment of cartilage defects to prevent osteoarthritis. They Developed ESCs derived chondrogenic cell for cartilage regeneration

**Investigator:**

<b>Name:</b>	Darryl D'Lima
<b>Institution:</b>	Scripps Health
<b>Type:</b>	PI

**Disease Focus:** Arthritis, Bone or Cartilage Disease

**Human Stem Cell Use:** Embryonic Stem Cell, iPS Cell

**Cell Line Generation:** iPS Cell

**Award Value:** \$3,118,431

**Status:** Closed

### Progress Reports

**Reporting Period:** Year 1

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**Reporting Period:** Year 2

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**Reporting Period:** Year 3

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Reporting Period: NCE

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## Grant Application Details

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**Application Title:** Stem Cell-Based Therapy for Cartilage Regeneration and Osteoarthritis

**Public Abstract:** Arthritis is the result of degeneration of cartilage (the tissue lining the joints) and leads to pain and limitation of function. Arthritis and other rheumatic diseases are among the most common of all health conditions and are the number one cause of disability in the United States. The annual economic impact of arthritis in the U.S. is estimated at over \$120 billion, representing more than 2% of the gross domestic product. The prevalence of arthritic conditions is also expected to increase as the population increases and ages in the coming decades. Current treatment options for osteoarthritis is limited to pain reduction and joint replacement surgery. Stem cells have tremendous potential for treating disease and replacing or regenerating the diseased tissue. This grant proposal will be valuable in weighing options for using stems cells in arthritis. It is very important to know the effect of aging on stems cells and how stem cell replacement might effectively treat the causes of osteoarthritis. We will establish conditions for stem cells to repair a surgical defect in laboratory models and test efficacy in animal models of cartilage defects. We will demonstrate that stem cells have anti-arthritic effects, establish optimal conditions for stem cells to migrate into the diseased tissue and initiate tissue repair, and test efficacy in animal models of arthritis. We will plan safety and efficacy studies for the preclinical phase, identify collaborators with the facilities to obtain, process, and provide cell-based therapies, and identify clinical collaborators in anticipation of clinical trials. If necessary we will also identify commercialization partners. Stem cells fight disease and repair tissues in the body. We anticipate that stem cells implanted in arthritic cartilage will treat the arthritis in addition to producing tissue to heal the defect in the cartilage. An approach that heals cartilage defects as well as treats the underlying arthritis would be very valuable. If our research is successful, this could lead to first ever treatment of osteoarthritis with or without stem cells. This treatment would have a huge impact on the large numbers of patients who suffer from arthritis as well as in reducing the economic burden created by arthritis.

**Statement of Benefit to California:** California has been at the forefront of biomedical research for more than 40 years and is internationally recognized as the biotechnology center of the world. The recent debate over the moral and the ethical issues of stem cell research has hampered the progress of scientific discoveries in this field, especially in the US. The CIRM is a unique institute that fosters ethical stem cell research in California. The CIRM also serves as an exemplary model for similar programs in other states and countries. This grant proposal falls under the mission statement of the CIRM for funding innovative research. The proposal will generate highly innovative and effective therapies for cartilage degeneration and osteoarthritis and will explore the potential use of tissue-engineered products from stem cells. If successful, this will further validate the significance of the CIRM program and will help maintain California's leading position at the cutting edge of biomedical research. Reducing the medical and economic burden of large numbers of patients who suffer from arthritis would be of significant benefit.

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